California Division of Mines and Geology

Fault Evaluation Report FER-15

September 16, 1976

1. Name of fault: Tule Creek and three related, unnamed faults (see figure 1).

2. Location of faults: Topatopa Mountains, Lion Canyon, Wheeler Springs, and Old Man Mountain 7.5' quadrangles, Ventura and Santa Barbara Counties, California.

3. Reason for evaluation: Part of 10-year program; zoned in Ventura County's Seismic and Safety Element (Nichols, 1974).

4. List of references:

a) Badger, R.L., 1957, Geology of the western Lion Canyon quadrangle, Ventura County, California: University of California, Los Angeles, unpublished M.A. thesis. Note: The geologic map was missing from the UCLA copy; a check was made and no copy was found either at UCLA, in the CDMG Los Angeles office, or in Jennings' files.

b) Dibblee, T.W., Jr., and Fisher, R.V., 1946a, Unpublished geologic mapping of the Old Man Mountain quadrangle, scale 1:31,680.

c) Dibblee, T.W., Jr., and Fisher, R.V., 1946b, Unpublished geologic mapping of the Wheeler Springs quadrangle, scale 1:31,680.

d) Dibblee, T.W., Jr., 1949, Unpublished geologic mapping of the Hines Peak quadrangle, scale 1:62,500. Remarks: No topography on base map, no roads, no sections, townships, and ranges; streams only shown.

e) Fisher, R.V., and Dibblee, T.W., Jr., 1961, Geology and possible significance of Munson Creek fault, San Rafael Mountains,

California: Bull. Am. Assoc. of Petroleum Geologists, v. 45, no. 9, p. 1572-1581, 7 figures.

f) Gross, D.J., 1958, Geology of the Ortega area, Ventura County, CA: University of California, Los Angeles, unpublished M.A. thesis, map scale 1:14,100.

g) Hagen, D.W., 1957, Geology of the Wheeler Springs area: University of California, Los Angeles, unpublished M.A. thesis, map scale 1:21,180.

h) Jennings, C.W., 1975, Fault map of California with locations of volcanoes, thermal springs and thermal wells: California Division of Mines and Geology, California Geologic Data Map Series, map no. 1, scale 1:750,000.

i) Jennings, C.W.,and Strand, R.G., 1969, Geologic map of California, Los Angeles sheet: California Division of Mines and Geology, scale 1:250,000.

j) Jestes, E.C., 1963, A stratigraphic study of some Eocene sandstones, northeastern Ventura Basin, California: University of California, Los Angeles, Ph.D. thesis, map scale 1:42,500.

k) Merrill, W.R., 1954, Geology of the Sespe Creek-Pine Mountain area, Ventura County in Geology of southern California: California Division of Mines and Geology, Bulletin 170, map sheet 3.

l) Nichols, D.R., 1974, Surface faulting in Seismic and Safety Elements of the Resources Plan and Program, Ventura County Planning Department, section II, p. 1-35, pl. 1.

m) Shmitka, R.O., 1968, Geology of the eastern portion of Lion Canyon quadrangle, Ventura County, California: University of

California, Davis, unpublished M.S. thesis, 86 p., 7 plates, map scale 1:12,000.

n) Weber, F.H., Jr., Kiessling, E.W., Sprotte, E.C., Johnson, J.A., Sherburne, R.W., and Cleveland, G.B., 1975 (Preliminary draft of 2/17/76), Seismic hazards study of Ventura County, California: California Division of Mines and Geology, open file report 76-5LA, 396 p., 9 plates.

o) Ziony, J.I., Wentworth, C.M., Buchanan-Banks, J.M., and Wagner, H.C., 1974, Preliminary map showing recency of faulting in coastal southern California: U.S. Geological Survey, Miscellaneous Field Studies Map MF-585, 15 p., map scale 1:250,000, 3 pl.

5. Summary of available data: The Tule Creek fault was zoned as a secondary fault hazard in the Ventura County Seismic and Safety Element (Nichols, 1974, after Jennings and Strand, 1969). Essentially all the faults shown by Jennings and Strand were zoned in the Element, apparently without consideration as to recency of activity. I assume that no attempt was made by Nichols to determine which faults were active, recently active, or inactive - hence all were zoned in the Element.

The Tule Creek fault, and the other faults, were not studied by Weber, et al. (1975, p. 179).

Jennings (1975) depicts the Tule Creek fault and the unnamed faults as pre-Quaternary in age, after the data summarized below.

Dibblee and Fisher (1946a, 1946b) and Dibblee (1949) first mapped the Tule Creek fault. The youngest unit cut by the Tule Creek fault is the Coldwater Formation (Eocene). The fault is overlain by alluvium (Recent) in a few places and by Pleistocene fanglomerate near the eastern

end of the fault (Dibblee and Fisher, 1946b).

Jestes (1963) maps the Tule Creek fault, but shows no Quaternary units present along the fault.

Shmitka (1968), although he discusses the ages and topographic expression of most of the faults that he studied, does not discuss the age of the Tule Creek fault. No Quaternary units are mapped by Shmitka along the fault.

Badger's (1957) geologic map was missing from his thesis, but in his text he notes that the topographic expression of the Tule Creek fault is due to the different attitudes of the bedrock units, and, thus, differential erosion along an older fault.

Gross (1958) shows the Tule Creek fault as not cutting alluvium (Quaternary). He further notes that the fault was difficult to follow in the Cozy Dell Formation (Eocene), because of the lack of topographic expression in the easily eroded shales.

Hagen (1957), as Dibblee and Fisher (1946b), shows Coldwater Formation as the youngest unit cut; and shows older alluvium (Pleistocene) as not being cut by the Tule Creek fault. He also implies that where the fault is topographically well defined, it is so as a result of differential erosion.

The youngest unit cut by the western-most unnamed fault ("A" in figure 1) is Cozy Dell Formation (Eocene). This fault is overlain only by landslide deposits; no other units younger than Cozy Dell occur along the fault (Dibblee and Fisher, 1946b). The youngest unit cut by faults "B" and "C" (figure 1) is Coldwater Formation (Eocene). These faults are overlain only by "Recent" alluvium at the south end of each mapped trace (Dibblee, 1949).

Ziony, et al. (1974) classify these faults as of unclassified age, the Tule Creek fault with late Pleistocene as a lower limit on the most recent activity.

6. Interpretation of air photos:

U.S. Department of Agriculture aerial photographs AXI-7K numbers 81 through 84 and 127 through 128, scale 1:2000, flown in 1953, were viewed stereo-optically. No features common to recently active faulting were observed. The strike of the bedding closely parallels the fault, as mapped, in the area examined. I was unable to distinguish the fault features from those features created by differential erosion of the surrounding bedrock. Faults "A", "B", and "C" (see figure 1) could not be identified.

ERTS photographs (high altitude) flight 73-006, numbers 7623 and 7622 were also viewed stereo-optically with similar results.

7. Field observations:

In light of the data presented above, field observations are not recommended.

8. Conclusions: The age of faulting along the Tule Creek fault is post-Coldwater Formation (Eocene) and pre-Holocene, since late Pleistocene deposits are not cut by the fault. Fault "A" (see figure 1) is post-Cozy Dell Formation (Eocene) (no minimum age can be assigned). Faults "B" and "C" are both post-Coldwater Formation (Eocene) are older than the youngest alluvium. Hence, faults "A", "B", and "C" could possibly have been active during the Holocene, however, they do not exhibit any features common only to recently active faults. Those fault related features present along any of the faults discussed are not diagnostic with respect to recency of

faulting. Indeed, there are areas where the precise location of the Tule Creek fault cannot be determined by means of aerial photos.

9. Recommendations: Under the present project guidelines, zoning of the Tule Creek fault and the three unnamed faults specified (see figure 1) is not recommended.

10. Investigating geologist's name; date:

Theodore C. Smith

THEODORE C. SMITH
Geologist
September 16, 1976

I concur with the recommendations -- zoning not warranted on the basis of available data.
GHH
10/22/76

Figure 1 (From Nichols, 1974)

HAZARDS PLATE I

SEISMIC & SAFETY ELEMENTS

of the

RESOURCES PLAN & PROGRAM

ventura county planning department

october 1974

MAP OF

THE NORTH HALF OF

VENTURA COUNTY

CALIFORNIA

GENERAL COUNTY MAP

FAULT HAZARD ZONES

PRIMARY: ZONES WHICH CONTAIN FAULTS WHICH HAVE BEEN ACTIVE DURING HISTORIC OR HOLOCENE TIME

SECONDARY: ZONES WHICH MAY CONTAIN ACTIVE OR POTENTIALLY ACTIVE FAULTS

NOTE: ZONE BOUNDARIES ARE APPROXIMATELY LOCATED

EARTH FAULTS

POSITIVELY IDENTIFIED

RELATIVELY WELL-IDENTIFIED AND/OR RELATIVELY ACCURATELY LOCATED

CONCEALED

"TOOTH SYMBOL" DENOTES THRUST FAULT, TEETH ARE DRAWN ON THE UPPER PLATE, DOWN-DIP SIDE OF FAULT

SOURCE: CALIF DIV OF MINES & GEOLOGY
VENTURA COUNTY DEPT OF PUBLIC WORKS

KERN

LOS ANGELES COUNTY

SIERRA MADRE FAULT

SAN GABRIEL FAULT

SANTA SUSANA MOUNTAIN THRUST

FRAZIER MT. THRUST

SAN CAYETANO FAULT

PINE MOUNTAIN FAULT

SANTA YNEZ FAULT

SANTA BARBARA COUNTY

Fault extends westward into Santa Barbara County

Faults discussed in FER-15

A

B

C